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THE JOURNAL OF PHILOSOPHY

THE FOUNDATIONS OF PSYCHOLOGY.

IN a recent ably written book, Professor Moore defends with great skill the thesis that "scientific psychology is independent alike of metaphysics on the one hand and of the biological sciences on the other, that there can be a complete science of psychology on this independent basis" (p. 2).[1] The discussion of this thesis requires a preliminary statement of the main features of Moore's conception of scientific psychology.

Although Moore cheerfully admits the possibility of "a new 'science of behavior'" (p. 58), he discards behaviorism as a form of psychology on the ground that it "rejects consciousness" and "introspection." At the other extreme, he objects to self-psychology, in spite of its introspective procedure, as "a metaphysical rather than a scientific psychology" (pp. 74 *et al*). This leaves him with the claims of functional and structural psychology to be harmonized. Functional psychology he distinguishes as concerned with the simple "act," or process "of experiencing" and not with its "object or 'content'" (p. 22),[2] and further as treating the mind "dynamically, as continuously active and never fixed"; whereas structural psychology "treats the mind statically" (p. 24). In Moore's view, both structuralism and functionalism "must be used to complement each other" (p. 30) by a psychology at once complete and independent.

From the physical sciences which Moore persistently and inexplicably calls "material," psychology, he holds, differs in the nature of its objects. "Mental objects" are differentiated in two ways from material. Negatively, they are described as non-spatial (p. 132), and the identification of mental with cerebral processes is here rightly described as "altogether fallacious" (p. 133). Positively, "the essential characteristic of psychical or mental facts" is said to be "that they are *private* objects of experience for one experiencer only" whereas "physical or material facts . . . are *common* objects of experience for all experiencers" (p. 138). Yet

[1] This paper is based throughout on *The Foundations of Psychology* by Jared Sparks Moore; Princeton University Press, 1921. Pp. xix + 239. The page references are to this book.

[2] Moore constantly makes the common confusion of "content" with "object."

psychology is a science, for it employs the scientific procedure, description and explanation; and psychology is furthermore an independent science since it postulates that "every mental phenomenon has a mental cause" (p. 168). Opposed to this independence theory is epiphenomenalism,[3] the theory urged by Münsterberg, Sidis, Titchener and others, a conception in accordance with which "mental phenomena are scientifically explicable only in terms of the accompanying brain processes" (p. 168). Moore condemns this concept as artificial and inadequate, a mere "explanation by correlation," not a causal explanation at all. "The scientist," he insists, "wants to be able to say '*A* is the cause of *B*,' '*B* is the effect of *A*'; and is certain to feel that such expressions as '*B* is explained when we think of it as parallel to *b*, which in its turn is the effect of *a*' . . . are poor substitutes for the more direct formula" (p. 176). That the "principle of independent causation" is beset with difficulties Moore does not deny; and, in particular, he sets forth the difficulties involved in the discontinuity of mental phenomena as contrasted with physical (p. 171), especially in the fact that "the antecedent of a sensation is not a psychical cause but a physical stimulus" (p. 172). He would meet this difficulty by the frank admission that "sensations have no cause," that they are by their very nature "scientifically inexplicable" (p. 182); and he explains other kinds of discontinuity "by the postulate of the subconscious" (p. 185). By the term *subconscious* Moore means "any form of psychical existence which underlies but is not identical with the personal consciousness (p. 189). . . . Historically," he notes, "the concept of the subconscious was constructed to fulfill a demand for continuity in mental life corresponding to that which characterizes the physical world" (p. 190). But empirically the concept is rooted in "the observation of certain phenomena which seem to involve psychical activity, and yet of which the subject is not personally conscious" (p. 192).

The purpose of the present paper is to present certain difficulties implied in Moore's form of the doctrine of independent psychical causation, with its correlated postulate of subconscious phenomena, and in his positive conception of mental phenomena, involving as it does the rejection of self-psychology.

I. A science in Moore's view has for its problem the "explanation" as well as the "systematic description" of its "particular group of facts" (p. 89 *f*). "Scientific explanation" he concludes, "consists primarily in the determination of the causal connections between the facts that have been observed . . ."[4] (p. 92). "If,"

[3] Moore does not use this term.

[4] Moore, however, later says (p. 174), "It is extremely questionable whether

he insists, "psychology is to be a complete and independent science it must postulate that every phenomenon has a mental cause" (p. 168). But whether or not Moore is right, as against Pearson and others, in this teaching that a science must be "explanatory" in a sense other than that of "completely descriptive" (pp. 95 *f*), and whether or not, supposing him to be right in this conception of science in general, he rightly insists that a scientific psychology must postulate that literally "*every* mental phenomenon"[5] has not only a cause but a "mental cause," so much is certain: Moore is far from establishing this latter contention. In other words, he does not prove that a specifically mental cause must be assigned to every mental phenomenon. In the case of sensation, as has appeared, he quite simply admits his failure and, to avoid regarding the uniformly antecedent neural excitation as cause of sensation, contentedly classifies sensations as "by their very nature scientifically inexplicable" (p. 182). But this is nothing other than a rejection of the basal concept of causation itself in the effort to save what is a corollary from it, the principle of independent causation in psychology. It may indeed be true that the psychologist "wants" in every case to be able to say: "*A* (mental fact) is the cause of *B* (another mental fact)" (p. 176); but Moore would, of course, be first to recognize that in scientific argument the wish is not father to the conclusion.

Again Moore may be challenged, not only for treating his postulate of "independent psychic causation" like a mathematical or logical axiom, but also for his arbitrary limitation of the concept of scientific explanation. An adequate development of this criticism would lead us too far afield; but it should at least be pointed out that he assumes throughout that there is but one type of scientific explanation, namely, the discovery of a regularly succeeding series of events. Only "one content may be the cause of another," so Moore teaches. Such a conception, whether valid or invalid, rules out both the tracing of logical relations and the demonstration of the relation of whole to parts as types of scientific explanation. It ought, therefore, to be argued and not assumed without argument.

II. The next following paragraphs criticize Moore's conception of psychology as both structural and functional. He readily admits with the self-psychologists that both the structural and the functional conceptions are abstract and artificial. But this he argues "is no valid objection to them, since all science is as such

the idea of 'necessary connection' is an essential part of the idea of cause: rather is it the case that 'uniformity of sequence' is all that is implied in the notion of causality."

[5] Italics mine.

abstract and artificial." It is abstract because "in order to give its attention undisturbedly to one special group of phenomena [it] voluntarily excludes from its consideration . . . questions . . . outside its own field" (p. 82). And it is artificial because "the scientific way," so far from being "natural, . . . is to analyze, to criticize and to formalize" (p. 83). It may be noted in passing that this is no real answer to the self-psychologist who never seeks to obliterate the difference between the "natural" method of everyday observation and the "artificial" method of science or to deny the occasional utility of constructs of the scientific imagination. What he does insist is that an adequate science deals not only with abstract constructs but with immediately observed concrete realities. Just as physics is concerned with dynamos as well as with electrons, chemistry with gases as well as with molecules, so, the self-psychologist continues, psychology must treat of selves as well as of "sense-elements" or of "psychic dispositions"; a merely structural or merely functional psychology is, in other words, inadequate.

Moore's specific way of meeting this charge is by his conception of psychology as both structural and functional. "We may," he says, "acknowledge the incompleteness of the structural method of description . . . and yet insist that the functional treatment is a sufficient supplement to the other" and that "structuralism and functionalism . . . must be combined in any complete psychology" (p. 74). But Moore never shows us in detail how such combination is to be effected. So far as description is concerned, psychology is, he teaches, mainly structural. For though "cognitive processes . . . may all be described in either structural or functional terms . . . the affective and conative processes . . . can not be described at all as mental processes[6] except in structural terms . . . by analyzing them into their elements" (pp. 30 *f*). In a word, it is structural psychology, which since it "treats the mind as a complex of sensations, affections, *etc.* . . . has to do primarily with the problem of description—general description, analysis and classification[7] (p. 117).

It might, however, be urged that Moore, though he assigns to the functional method no important rôle in description, attributes to it a part in explanation. "Functional psychology" he says, "treats mental processes as phases of a continuous stream of con-

[6] It may be remarked in passing, that though Moore has earlier denied to the structuralist the use of the term "process" (p. 27), he himself here uses it as a synonym for "idea" or "phenomenon."

[7] Here and elsewhere Moore makes the characteristic claim of structuralists that the method of description is their exclusive property. They never show why all analysis is of necessity in structural terms.

sciousness and so has its primary value in the field of explanation" (p. 117). But the difficulty here is to know precisely what Moore means by "phases of a stream." He can not mean "successive events in a series" for, apart from the fact that this reading distorts the meaning of the terms, it expresses the view not of the functionalist but of the structuralist. Nor can Moore be supposed to use the words in the manner of the self-psychologist, although a continuing self may be said to have phases. We must accordingly ignore this conception of the mental process as a "phase" in favor of Moore's basal conception of mental process as "act of experiencing." But this at once involves us in another difficulty. For the act of experiencing has no conceivable "special value" as explanation beyond that of the structural content.

It should be added that Moore also uses the term "function" in the semi-biological sense of adjustment of "the entire psychological organism . . . to the varying conditions of the environment" (p. 28). But though behaviorists and advocates of physiological causes in psychology may hold that functions, in this sense of the word, can "explain," such a view is untenable by Moore with his strict doctrine of independent psychical causation.[8]

III. The wholly disappointing outcome of this effort to understand Moore's position is then the following: He admits with the self-psychologist the inadequacy of structural psychology, and yet he is unsuccessful in his effort concretely to supply the defect by use of the functional method. It is the more to be regretted that, in his criticism of self-psychology, he ignores utterly its specific concepts of perception, thought, emotion, and the like, conceived as reactions of the self to environment and, neglecting the self-psychologist's detailed analyses, confines himself to more general arguments against self-psychology. (*a*) His chief argument is repeatedly stated. "The leading objection," he reiterates, "to self-psychology is that it is a metaphysical rather than a scientific psychology" (p. 74). This criticism at once reveals the peculiar vagueness and confusedness of Moore's conception of metaphysics. He proposes many definitions. Metaphysics "has for its problem the interpretation of phenomena" (p. 97), whereas the problem of science is the "description and explanation" of phenomena; and to interpret a phenomenon is to give "its meaning, its import" (p. 101). Again, "philosophy . . . has to do entirely with purposes and ignores causes" (p. 97). Finally, the metaphysical problem may be defined as that of *evaluation,* "determining the values of

[8] *Cf.* Moore's assertion that a "strict adherence," to the "functional method" would leave psychology "maimed, impotent and completely at the mercy of physiology" (p. 30).

phenomena'' (p. 98). By these statements Moore assumes uncritically, that ''meaning,'' ''purpose,'' and ''value'' are precisely equivalent terms. Furthermore, he obliterates his own distinction of philosophy from normative science on the one hand and from everyday observation on the other. For he later treats the normative sciences, logic, ethics, and esthetics as concerned with evaluation (p. 119) and as constituting one branch only of philosophy (p. 121). And he describes the ''appreciation'' of the ''meanings'' of one's friend's mind (p. 115) as merely everyday experience.

The only way in which Moore argues the metaphysical nature of self is by the statement that the self must be a ''permanent'' reality ''underlying'' mental phenomena and as such the object of metaphysical not psychological consideration (p. 75). This criticism seems, however, to be founded on a misinterpretation of the self-psychologist's conception. The latter claims for the self not metaphysical permanence but only the sort of persistence involved in the fact of recognition. And persistence in this sense is admitted by Moore, notably in his doctrine of the subconscious. For the most part, however, Moore does not argue, rather he simply asserts, that the self of self-psychology is a metaphysical entity. ''To speak of the self,'' he says, ''as anything more than a sum-total of phenomena, is to leave the bounds of science and enter the realm of metaphysics'' (p. 75). And a little later: ''Any conception of something which . . . 'has' ideas, feelings, sensations, *etc.* is necessarily a philosophical conception. . . . The psychological conception of the self is that of a mere 'interrelated' system of mental phenomena'' (p. 77). In the teeth of this assertion, however, the self-psychologist insists that there is a psychological as well as a metaphysical way of studying the self and that psychology *must* simply accept selves ''on their face value as observed facts.'' The issue between Moore and the self-psychologist is thus fairly drawn; and we turn from this debatable doctrine of the metaphysical self to Moore's criticism of the precise positions of self-psychology.

(*b*) Besides rejecting self-psychology on the ground that it is really a form of metaphysics, Moore criticizes in a very spirited manner two arguments advanced by self-psychologists. (1) The self-psychologist, Moore points out, in the first place, bases his ''conception positively on 'the testimony of introspection' the alleged empirical fact that self-consciousness is always present'' (p. 77). Moore objects that ''the great mass of psychologists deny this so-called 'fact of introspection.' '' He concludes that ''if self-psychology is to rest its defence on empirical considerations . . . and if the alleged facts of introspection prove to be by no means

universal, it would seem that there is nothing left for self-psychology to do but accept the inevitable'' (pp. 78 *f.*). But very curiously Moore, who is usually scrupulous in hearing people in their own defence, does not refer to the self-psychologist's careful answer to this formidable indictment. This answer consists, first, in pointing out that many who deny the occurrence of self-consciousness mean by the term not at all what the self-psychologist means, but mean either ''a philosophical, logically analyzed consciousness of self'' or else simply ''morbid, embarrassed, over-attentive consciousness of myself.''[9] But to deny that one is always conscious of self in either of these latter senses of the word is not at all to deny that one is always conscious of self in the self-psychologist's use of the term to mean any awareness of self, however vague, inchoate, and inarticulate.

The self-psychologist, in truth, admits the failure of many trained observers to report the observation of self. He believes, however, that this failure can readily be explained. For, on the one hand, the very fact that one is always conscious of the self tends to make one inattentive to it; and, on the other hand, the student of psychology is often deliberately trained both to regard every reference to self as a lapse from scientific into popular description and also to believe that sensations, affections, and the like are the sole terms of a scientific psychological description. ''Evidently the well-trained subject, taught that introspection consists in an enumeration of such elements, . . . will report these only. . . . For it is clear that if introspection be defined as enumeration of 'conscious processes' and if description be limited to objects radically different from those of ordinary introspections, then the self is excluded by instruction.''[10]

(2) To the second of the considerations urged by the self-psychologist Moore pays scant attention. This argument, as summarized by Moore, consists in ''pointing out . . . that some or all of those who deny the existence of a self-for-psychology implicitly assume the existence of such a self'' (p. 79) and in insisting that ''the opponent of self-psychology should avoid such terms in his

[9] This seems to have been the meaning of self-consciousness in the minds of the subjects of Titchener's study. *Cf.* p. 78, with citations.

[10] Quoted from the reviewer's ''The Self in Scientific Psychology,'' *Amer. Journal of Psychology*, 1915, XXVI, pp. 522, 524. It may here be noted that Professor E. A. Gamble's statement that the self is known ''in'' but not ''by'' introspection (a distinction which Moore rightly regards as inconsistent with self-psychology) is due to the fact that she clings to the arbitrary conception of introspection (in the ''narrower'' or ''standard sense'') as observation of experiences. *Cf.* E. A. Gamble, ''A Defence of Psychology as Science of Selves,'' *Psychol. Bulletin*, 1915, Vol. XII., p. 196, cited by Moore, p. 81.

descriptions'' as ''*we* find,'' ''*I* attend,'' ''*I* perceive'' (p. 79). To this Moore responds briefly and breezily: ''Well . . . so he does in his severest moods and it is only to obviate the charge of pedantry, or unnecessary circumlocution that he does not always do so'' (p. 79). The self-psychologist frankly challenges this assertion. In his observation all psychologists, in severer as in lighter mood, by their own definitions and descriptions imply the existence of self, thus turning against themselves all their arguments against self-psychology. The attentive reader of Moore will find abundant confirmation of this statement as the succeeding paragraphs propose to show.

Aside from the incidental references to a self which might conceivably be justified as due to desire ''to obviate the charge of pedantry,'' (p. 79) there are embedded in Moore's teaching at least three fundamental conceptions of which each presupposes the existence of the self. Of these the first is the conception of introspection as the ''direct observation of *one's own* mental processes'' (p. 42). If introspection is psychological observation, and if psychology is concerned only with mental processes, why the tell-tale words ''one's own'' in this formal definition? And why does Moore expand the definition in these words: ''in introspecting, the objects introspected are a part of myself—*I* think, *I* remember, *I* feel pleased, *I* will''[11] (p. 43). In his later criticism of self-psychology Moore insists that such a statement as ''I perceive objects'' is precisely synonymous with ''A percept is made up of sensations and memory images'' (p. 79), in other words, that self-psychology is a mere matter of words. But here, where he is defending introspection against behaviorists, he does not dream of undertaking the impossible task of excluding the self from the objects of our introspection. He does not try to persuade us that the introspective report ''*I* feel pleased,'' might be replaced without loss of meaning by the words ''A complex of organic sensations and affections of pleasantness occurred.'' In fact, he says flatly that ''without self-consciousness introspection is impossible'' (p. 43); and by these words he asserts, not merely the existence, but the direct consciousness of self. (*Cf.* p. 80.)

The distinction of mental objects as private, from physical (in Moore's phrase, material) objects as common, is the second of Moore's formal doctrines which clearly assumes a direct consciousness of self. ''Physical facts,'' he says in a paragraph from which quotation has already been made, ''are by their very nature facts which may be experienced by any number of experiencers together:

[11] The italics of this paragraph, except those of the personal pronouns, are my own.

mental facts are by their very nature facts which may be experienced by only one experiencer'' (p. 138). The crucial concept here is obviously neither that of experiencing function nor of experienced object or content but of experiencer, or self. And when Moore goes on to say, in the course of his answer to a critic of the privacy-of-mental-phenomena doctrine, ''I, only, am *conscious* of my own mental states'' (p. 140), he obviously is not using the term *I* merely for brevity's sake or merely ''to obviate the charge of pedantry.''

Moore's conception, in the third place, of recognition implies the existence of a self. He discusses recognition as one of the phenomena which constitute empirical evidence of the subconscious. Conscious recognition he describes as ''the revival of an experience which *I myself,* have had before . . . the conscious identification of a memory-image with some . . . idea in [my] own past experience'' (p. 193). The phenomena of recognition, he holds, ''seem to indicate that underneath . . . the apparent discontinuity of mental life . . . there is a real persisting self binding together the more or less discrete moments of consciousness'' (p. 192). It is certainly difficult to understand why, if Moore sees no objection to a persistent subconscious self, he should be so certain that a ''relatively persistent'' conscious self must be eschewed by the scientific psychologist.

There is little need to multiply quotations. Evidently Moore himself ''in his severest moods''—when he is setting forth his basal conceptions of introspection, the privacy of mental phenomena, and the existence of the subconscious—refers to the observed, the unique, the persistent self.

IV. The preceding paragraph has led inevitably to the last of the topics of our criticism, Moore's doctrine of the subconscious. Already doubts of its validity have suggested themselves. To begin with, Moore has based his rejection of the rival doctrine, that of unconscious cerebration, on the postulate of complete and independent mental causation (pp. 218, 226). But Moore, as has appeared, has himself admitted one case at least where this postulate of independent mental causation is not relevant, and we are justified in challenging his ruthless use of it here.

A second difficulty in Moore's adoption of the subconscious is involved in his definition of mental phenomena. Subconscious phenomena, he reiterates, are mental facts; but the essential character of mental facts, he has insisted, is precisely this, that they are ''private objects of experience for one experiencer only,'' ''facts which may be experienced by only one experiencer'' (p. 138), ''personal, intimate, individual, 'private,' 'unshared' parts of a

personal stream'' (p. 147). ''Subconscious mental processes,'' on the other hand, are described by Moore as ''processes going on in the organism[12] of which the personality is unaware'' (p. 210). But it is plain that such processes are not mental facts at all according to Moore's own description of mental facts as ''private parts of a personal stream.'' Consequently, Moore's opposition to Münsterberg's statement, ''psychical objects which have their existence below consciousness are as impossible as a wooden piece of iron,'' and to Baldwin's ''consciousness is the common . . . form of all mental states'' (p. 209), is explicable only on the hypothesis that he has temporarily forgotten his own doctrine of the privately experienced character of mental facts.

A final difficulty, from Moore's own standpoint, in his doctrine of the subconscious is the fact that it is flagrantly at odds with his attitude toward self-psychology. As has already appeared, Moore argues the existence of the subconscious from facts of recognition which ''indicate,'' he says, ''that underneath there is a real persisting self'' (p. 192). Furthermore, Moore always defines the subconscious with negative reference to the conscious self: Thus, ''the personality is not aware of that which is subconscious'' (p. 189); and the concept of the subconscious ''is not opposed to that of 'consciousness' as a general term for mental activity, but to that of '*personal* consciousness'—of awareness by the personality, whatever philosophers may define that to be'' (p. 210). A concreter instance is the statement: ''When attending an orchestral concert I am conscious of the total volume of sound, of the lights. . . . But over and above all this there will be a vast number of phenomena of which I am totally 'unconscious' so far as *I* (my personality) am concerned, and yet of which I may easily become conscious'' (pp. 213 *f.*). Occasionally Moore even indirectly attributes to the ''conscious, personal self'' a certain power, or effectiveness. Thus, he describes dissociated ''contents'' as ''beyond the control of the personality'' (p. 199)—a phrase which certainly suggests the consciousness of self in a sense other than that of ''inefficient spectator.''

No self-psychologist can lay down *The Foundations of Psychology* without a poignant regret for that ineradicable bent toward content-psychology which has closed its tolerant author's mind to the fitness of self-psychology for his own special ends, the differentation of psychological from biological procedure, and the

[12] This phrase lends itself to the interpretation, rejected by Moore, of those who uphold the unconscious cerebration theory.

explanation of freshly recognized and unaccountable experiences through the conception of an underlying, conscious being.

MARY WHITON CALKINS.

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DURATION AND RELATIVITY

WHAT has become of length, mass, and time,—those fundamentals of physics which Newton told us were the individual building blocks upon which we could always rely and with which we could build any structure however complex? Professor Einstein has produced a mental earthquake and shattered them completely. They can never appear to us now as they formerly did. We used to think of them as entirely different individuals working harmoniously together, but now we know them to be one person, Mr. Space-Time, wearing an infinite number of disguises in order to please everybody.

We have to thank Professor Einstein for having shown up the real man under the disguise of L, M and T. In the field of physical science it surely constitutes an enormous advance to find an invariant and equations of transformation. But Professor Einstein has done more than this for us. He has shown that *any* description of phenomena may be true provided we measure it always within its own frame of reference, and that truth itself is relative since practically we have to measure it from a frame of reference we ourselves set up.

Now these two ideas, new to physics, are not new in philosophy. Our own William James took the same stand and gave us *A Pluralistic Universe* and *Pragmatism*. Our differences and troubles on this earth are due largely to the fact that our life experience gives us unique frames of reference from which we measure everything, but it does not give us much power to move about from one frame to another, and so we do not readily understand the other fellow's point of view. In practical matters common to all, William James had remarkable powers for moving about from frame to frame and that is one cause of his greatness. See, for instance, his sympathetic handling of psychical facts in *The Varieties of Religious Experience*. In mathematical physics Professor Einstein has shown the same power and so he gave us *Relativity*. Whether or not something we read means anything to us will depend upon whether the frame of reference within which it is written is a frame we have used and so understand.

Professor Bergson has proved to our satisfaction that prophecy respecting oneself can never be accurate. We can not predict our

own future. This can be explained as follows: Let a line from A to B represent events in our life, B being the present moment when the prophecy is made and A the moment of our birth. Assume C is the future event prophesied lying on the line AB prolonged in the future. Now when the cause of C is the whole line AC, manifestly C can not be correctly predicted since some of the cause, namely BC, can not be known at the moment B even if we know the whole of AB. In general, whenever the cause of C has not appeared in AB, C can not be predicted at the moment B. One must wait until C happens, but then the C event can only be described since it is no longer in the future.

Now admitting this fact, will it ever be possible for John to prophesy the C event to William at the moment which William calls B? Yes, if time is not an absolute and if William's future is John's present. According to the theory of relativity time is not an absolute. Time units, as measured by clocks in different frames of reference which have motion relative to each other, will not agree. We think it can be shown that John and William have to use different frames of reference for measuring time even if there is no relative motion between them, only in this case it is real time or *duration* and not physical time that they measure.

We wish now to define certain terms as they will be used in this article.

By *physical time* we mean time as measured by clocks.

By *duration* we mean *"la duré"* of Bergson. It is time as measured by each of us subjectively. It is our consciousness of the accumulation of experience and gives us memory. This constitutes the single dimension of our own unique psychical world, and, added to the four-dimensional space-time physical world common to all of us, shows us to be five-dimensional beings. This idea might be represented by lines in a two-dimensional frame of reference, in which the X axis is physical time and the Y axis some one of the three dimensions of space. Duration would then be measured back along each line, being one-dimensional, provided, however, it is understood that measurement in duration is not a sum of quantities, but only a consciousness of change in quality, which change, however, is connected with physical time which, of course, can be measured quantitatively, that is, by clocks.

This must be clearly understood. Bergson shows that our consciousness of the intensity of shadows, which is of course quality, is always interpreted by us in terms of the quantitative difference in the physical cause of these shadows. We say one shadow is twice as intense as another only because and when we know the former to be produced by two candles, say, and the latter by one.

The interpretation of quality in terms of quantity is a mistake that the intellect has to make because its only language is quantity.

Now let us represent two of these duration lines as the lives of John and William. To John, William's line can generally be seen only as position in space-time; William is physical only. But to William, William is both physical and psychical because he sees himself in two worlds at once. He knows himself to live in both space-time and duration; he knows he is five-dimensional. Now suppose that these lines cross each other. They will have a point in common which will be a world event as measured in space-time, but it will also mean that at this point John and William understand each other intuitively, they are at one with each other. These points of intersection are the world events that produce love and sympathy between human beings. It is these events which force us to believe that other human beings besides ourselves have a fifth dimension in spite of the fact that generally they appear to us as only four-dimensional, or physical.

We have felt it necessary to enlarge on this idea of duration because, although Bergson is at great pains to show the difference between duration and the time of physics, he does not anywhere, so far as we know, treat duration as the fifth dimension of experience. We hold that conscious beings having memory may be said to live in a five-dimensional world, namely, the world of space-time-duration. To each of us all others appear generally to live only in four dimensions, that is, they are physical. But we have experiences in which our fifth dimensions cross and it is these experiences that allow us to understand each other intuitively.

We will now continue with our definitions.

By *absolute age* we mean the physical time that has passed since the beginning of all life, as measured by our clocks.

By *relative age* we mean the physical time that has passed since the birth of any living individual, also measured by our clocks.

By *psychical age* we mean the *duration* that has passed for the line of life ending in any individual as measured in the consciousness of that individual.

So far as physical time is concerned, it seems as if all life was of the same absolute age. Each of us represents the last term in a continuous line of life extending backward indefinitely. If we can rid ourselves of a rigid concept of personality and think of life only as a flow of experience manifesting itself in and through generation after generation, then we will see that what we call growing old is only a change in the quality of our duration. We are all of the same absolute age but we differ in relative age and most important of all we differ in psychical age. This difference

in psychical age simply means that during the whole of our absolute age our experience, accumulated and carried forward to us through heredity, biological and social, that is to say, our duration, has had a certain unique quality which differs from that of every other human being.

We must always remember that the largest part of our inheritance is social. We have only two physical parents but we have an enormous number of social parents. Everything obtained by us from the past through literature, which is a real factor in our lives, is quite as definitely our inheritance as is the quality of the germ plasm from which we sprang physically. The broader our culture the greater the number of social parents from whom we inherit, and the greater will be our evolutionary progress in duration. The similarity between the two kinds of inheritance is indeed very great. We recognize that there are many physical traits inherited which do not show up in the soma for some time after birth although they exist as latent from conception. In the same way something we read may produce no effect on us until years afterward. We inherit it when we first read it, but it requires the passage of physical time so to alter the quality of our duration that this inheritance can show up definitely in our lives. We here make this distinction between social inheritance and environment. We call social inheritance only those experiences produced by our environment which go below the surface, so to speak, and definitely alter our duration. All experience effects us in terms of space-time, of course, but some experiences go further, they alter our duration, and these are what we mean by social inheritance. Social inheritance affects all five dimensions. It is the aim of education to turn all experience into social inheritance; we try to alter duration.

Our duration curve may cross and recross the curves of other people, and it will thereby have points in common with these other curves, producing understanding and sympathy, but it never can coincide completely with these other curves. It is this duration, this fifth dimension, that shapes our lives and makes us what we are. This seems to us to be what Buddhists mean by Karma.

In the physical world it is only when relative motion approaches that of light that the difference in physical time units becomes of practical importance. In the psychical world we think it is only when the difference in psychical age is very great that our attention is called to it. When this difference is very great we get the genius who startles us with his insight. His present appears as our future and that is why he means so much to us. He is then the true prophet for *us*. One thinks immediately of Confucius, Buddha, and Christ. Although these men stood at the same point

of physical time as did their contemporaries, they were very much older psychically than the rest of us. What to them was a vivid present is even now only an uncertain future to the race. The flow of life ending in them had lived more duration than it has in the rest of us. "More" is used only in the sense that the quality of duration in them can not be produced in us until more physical time has passed for the race. An identity of intensity of two shadows can be produced by increasing the physical cause of one of them.

It seems to us that the great religious teachers dealt wholly with the fifth dimension or human duration. But in order to explain their ideas to others they, of course, had to use language, which is the function of the intellect. Now it is the main characteristic of the intellect, as Bergson clearly shows, that it is at ease only when dealing with quantity, or the space-time of relativity. Therefore, religious writings were bound to be misinterpreted in terms of space-time instead of duration. A wrong frame of reference is used by most of us even now with regard to such writings. A literal interpretation of the Bible amounts to just this, and it also accounts for the existence of different sects, each sect thinking itself the *only* right one. As a matter of fact each sect is right in the sense that its interpretation fits the quality of duration in its followers. This is the Pragmatism of James and the Relativity of Einstein philosophically considered. To us it appears that the Heaven and Hell of Christianity and the Nirvana of Buddhism represent only qualities of duration. We have ourselves experienced both of the former many times, but we have not yet evolved far enough in physical time to reach a duration which we could call Nirvana. For western peoples Nirvana is not easy to understand. If we were to describe our understanding of it in the frame of reference we are using here, we would say that it is a quality of duration which permits one to get into harmony with *any* physical condition in which one may find oneself. It gives one the power of moving about among frames of reference so easily that no matter what condition of space-time one may be in, one can always find some frame of reference from which this space-time condition appears beautiful, profitable, and harmonious. Discords do not exist. In the mathematical world only Einstein and a very few of the great mathematicians have this power of moving about easily from frame to frame. William James and Bergson have it in philosophy. In the world of human intercourse Christ and Buddha certainly had it. In politics our own President Wilson certainly did not have it, while Lloyd George has it extraordinarily well developed.

If we were to describe Nirvana from a different frame of refer-

ence, say from that frame used by psychoanalysts, we might say that our unconscious ego, which is our duration which never enters consciousness, is of such a quality that no matter what may be our space-time environment, the spontaneous urge of our duration is never anti-social; sublimation is not necessary and the censor has nothing to do. Psychoanalysts realize that much physical time must pass before this condition can ever be common in the race. In just the same way Buddhists claim that many reincarnations must take place before one can reach Nirvana. You see it is possible to find an equation of transformation which shows us there is not so great a difference between western science and eastern philosophy as most of us have thought.

It has been the characteristic of western peoples that their main interest lay in space-time. They have professed Christianity but they have rarely practised it. They have not professed materialism but they have always practised it. They have specialized in the first four dimensions of experience and thus gave science to the world. The east, on the other hand, has spent most of its time experimenting with the fifth dimension; that is why all religions and mysticism came out of the east. We have overspecialized in space-time and the east has overspecialized in duration. We need to profit by the errors of the other.

Let us try to represent our concept of duration once more, using a different graphical method. Our illustration will have the error common to intellectual statements, the error of representing quality in terms of quantity, yet the illustration may be suggestive. In this case let the X axis represent physical time the Y axis duration, the origin being the beginning of life. We will draw two curves representing respectively the lives of John and William. The equation of these curves will be for John $Y = 20^x - 1$, and for William $Y' = 10^x - 1$ where X has positive values only from 0 up. For $X = 0$, $Y = Y' = 0$. At the origin duration for all is 0. For $X = 2$, $Y = 399$, $Y' = 99$. The greater ordinate includes the lesser in space-time. In duration this means that John can understand William, but William can not wholly understand John. For $Y' = 399$, $X = 2.6021$. More physical time must pass for William to reach the point 399 in duration. John's present is William's future. We must not press this too far. It can never represent the exact truth but it may help us to see a relation between the physical quantity "time" and the psychical quality "duration."

To sum up, then, we would say: we think our experience is five-dimensional. The physical world of quantity has the four dimensions of relativity. This world is space-time and is common to all of us. The fifth dimension is *duration*. It is unique for each of

us but it is quality not quantity. It makes us what we are; the east calls it Karma; and it is this fifth dimension that has brought into existence love, sympathy, and understanding between men.

A. A. MERRILL.

BOOK REVIEWS

The Esthetic Basis of Greek Art of the Fifth and Fourth Centuries B.C. Bryn Mawr Notes and Monographs, No. 1. RHYS CARPENTER. Bryn Mawr College, Bryn Mawr, Pennsylvania. 1921. Pp. viii + 263.

In spite of various modernisms, Greek art remains today more nearly a standard of achievement than does the art of any other people. It has seemed, therefore, to Professor Carpenter that a fresh analysis of the methods of Greek artists, in so far as they are found to illustrate a theory of procedure, might sharpen our analytic appreciations of what they produced, and might put us on the track of general principles or considerations which could be illustrated from the art of other times and places. As for the former point, Dr. Carpenter has certainly succeeded,—at least for the great majority of those interested in the subject. Whether one altogether agrees is another question, but most of us ought to have better eyes from studying this essay; and as for the second point, the author has, I think, succeeded also.

Dr. Carpenter has noticed what most of us notice but do not think about,—that Greek art has both great distinction of design and a strong preference for the forms of life. It is as though art like life and like truth seeks to be "according to nature," where "nature" is not so much the lifeless strata as that which lives and grows. If one protests that architecture can follow this lead only in slight and insignificant ways, only in details of decoration, this objection is disposed of in a way that is full of suggestion, whether it is a true description of the facts or not. For the theory is larger and more important than the phraseology in which Dr. Carpenter happens to have stated it. Putting architecture aside, then, for a moment, we may admit that Greek art, when most successful and most free, is a synthesis of two factors,—forms derived from living nature and recognizable as such, and the design which these forms are made to embody, or with which they are arranged. Neither by itself will do; representation without design lacks beauty, and design with purely formal elements may be decorative but is far less effective. Any work of art aims to stir a specific emotion, and without these two factors, the picture and the pattern, the spectator feels no response of this specific sort. Greek art is, in other words, as animistic as it can be

under conditions imposed by the necessity of design. However formless nature may often be, a work of art must not be lop-sided or top-heavy or disproportioned. "Craftsmen in all times and places have pursued this practise of artistic animism . . . the legs of chairs become the legs and claws of beasts; the stand of a mirror becomes a human being, the shaft of a column becomes a giant or a maiden with a basket on her head, a bracelet becomes a twisted snake," indeed (page 13) "much of the wizardry of poetry rests upon this same instinct animizing the inanimate." "Greek artists rethought the inanimate, wherever possible, into animate terms." One result was a symbolism. "A crab at the foot of a boulder gives us the Saronic Gulf washing the base of the Scironian cliffs, dolphins stand for the sea, fresh-water fish for rivers, a heron for marshland, a swan for a lake." "Greek coins are the *locus classicus*" for the study of this animistic symbolism.

The emotional qualities of the response depend, however, in the first place, upon design. "A straight line looks stiff; certain curves appeal to us as graceful; wavy lines have a restless effect; and more complex lines compound more complicated phenomena of the same general sort." "The things in the picture take to themselves the emotional qualities which are latent in the pure forms." But the combination of design and theme may be presented, according to circumstances, with what Dr. Carpenter calls a one-, two-, or three-dimensional emphasis.

The simplest way of representing an object is to scratch its outline on a surface. The surface is, of course, two-dimensional but the representation is "linear," and this is, if I understand, what Dr. Carpenter means by the one-dimensional character. It is best exemplified by the figures on Greek vases, *i.e.*, on the early red-figured ones, for though Dr. Carpenter does not explicitly say so, I should think the black-figured vases would be two-dimensional. Where the eye "instead of moving continually under the incitement, and to the lead of lines, now rests on the full areas of color" as in the case of the white-ground Attic lekythoi, and also in the case of carved relief, whether colored or not, we have the representation not merely in outline but with the dimensions of a surface. "Finally there is three-dimensional presentation, the cardinal problem of sculpture in the round and one of the great preoccupations of architecture (though not in classical Greece), and of painting in certain very developed periods of its career."

It is three-dimensional art which offers to the analyst the most subtle and most difficult problems, and it is, accordingly, to the perplexities of it that Dr. Carpenter especially addresses himself.

An attempt to convey in a few lines the substance of the chapter

on sculpture can hardly succeed, and will not be fair to the author. However!

Wax works aim at illusion, but art shuns it, and usually the physical medium of the art is so different from the matter of the object represented that illusion is guarded against. Or in the case of drama, isolation on the stage behind foot-lights, the "stage picture" serves the purpose. To-day, the entire absence of color is the device of sculpture and its great privilege. "Early Greek stone carving . . . colored brilliantly, but conventionally." Later on, color may have gone gradually out of fashion. But whatever Greek practise may have been, unstained marble makes illusion impossible and "thereby facilitates the peculiar power of sculpture to work on us through spatial forms of its own devising." We come then to the theory of these spatial forms. The problems are those of a three-dimensional art, and the difficulty is that of making the values of the third dimension evident to the eye.

As Dr. Carpenter puts it, the sculptor proceeds "By removing as much as possible from the difficult dimension and showing it in the two easy ones. . . . In practise, this amounts to the employment of three very definite devices: (1) intelligible pose, (2) planes of composition, (3) 'modelling' lines." These terms, except, perhaps, the last one, more or less explain themselves. A statue should be so posed as to enable us to recognize the same theme from every probable point of view. A warrior seen from one position must be the same warrior when seen from any other, and this requirement, Mr. Carpenter tells, causes a great deal of trouble. The Man with the Calf, for instance, can be seen only from in front. Its pattern is so completely two-dimensional that seen from in front, it is hard to see it as a solid. It was Lysippus who finally solved the problem by so posing the figure that one is never altogether in front or behind or at the side; he accomplished this by twisting the body on its vertical axis. "This gradual torsion carried through the whole body is the typical Hellenistic (or should we say Lysippic and Rhodian?) formula for producing an 'omnifacial' composition." "Planes of composition" have to do with defining the depth of the figure. Planes of composition are like a series of rows of hills, one behind another. Such a perspective enormously heightens the value of the third dimension. In the case of sculpture the planes show where the composition begins and where it leaves off. Frontal compositions, like the Man with the Calf, are all in one plane and, therefore, without depth. "But the most potent elements in this whole process are the numerous devices of linear suggestion by which the third dimension may be conjured up. These may be classed together and called 'modelling lines.'" And since these "modelling lines" are

the most potent elements of all, I am embarrased by the need of confessing that I do not clearly understand what is meant. The emphasis is, however, on the adjective "modelling"; and the "Fates" of the Parthenon pediment are the convincing illustration. What they illustrate, according to Mr. Carpenter, is "projection in the invisible dimension suggested by equivalent curves lying in the visible planes."

The fluting of a column has the function, we are told, of presenting to the eye an impression of the volume which the column really has. An unfluted column might look flat. Are the fluting-lines "modelling lines"? Are the strongly undercut lines of the drapery of the Fates "modelling lines"? Seen as we see the Fates today in the British Museum, only a little higher than our own heads, such undercutting may have no such function to perform as when the figures had to be seen at the elevation of the temple pediment. Are nude figures at any disadvantage with respect to "modelling lines"? Mr. Carpenter holds that the technique of these lines is essential to sculpture at its best, and that they are found in much of the best modern work, notably in Michelangelo.

The chapter on sculpture ends with a brilliant little study "of that quality called idealism—the property of Greek art which more than any other has been extolled and misunderstood by succeeding centuries of classical enthusiasts." It is a little too long to review in any detail, but the conclusion is that until Lysippus, sculpture never became quite free from the tradition of standardized parts inherited from the early time.

These standardized parts were assembled according to definite numerical proportions, the canon of the art. Sculpture had its order in the same mathematical sense that architecture did. "But the mere literal incorporation of these numbers in an artistic representation will fall short of beauty because it will show only the mathematics and not the living thing." "The Canon is this underlying uniformity, the *eidos* of Greek philosophic speculation." The thesis is summarized as follows: "the 'idealism,' the 'classic restraint,' the 'omission of non-essentials' so characteristic of fifth-century Greek sculpture, are all traceable to the attempt to put into material guise an almost metaphysical abstraction, a type form which should satisfy the reason in its quest of perfection, and through the senses lead it on to attain the supersensual. This seemingly unsculptural and unreal trend originated in and developed out of the schematic forms of archaic art, which in turn grew out of psychological accidents wholly irrelevant to fifth-century ideas" (p. 145). The Greek sculptor was not copying the approximations that happened to exist; he was rendering his subject matter "according to nature" in the Greek

metaphysical sense. Only, and this is the interesting point for esthetics, he must not render quite "according to nature." Albrecht Dürer, too, found out that his arithmetical canon "was a standard from which to deviate, not a standard toward which to strive."

Mr. Carpenter attempts now to utilize the above-mentioned principles in the comprehension of Greek architecture. "Why," he asks, "are the old Greek Orders still retained today and why are no new Orders invented to supplement or supplant such hackneyed forms or formulæ? When so much might be created, why only an uninventive repetition of a fashion that everyone must have seen a thousand times? In a word, why does architecture persist in having 'Orders' at all?" The answer is unexpected in the sense intended. "The paucity of invention, the seemingly suicidal restraint of variety, are necessary because architecture is seeking to establish for itself a real world of recognized and recognizable objects. Painting has the seen world to draw upon. . . . But architecture has to invent its world of objects first before it can use them." Thus certain types and patterns have come to constitute a "world of real objects" to be composed according to the principles of mathematics and physics.

The mathematical control of Greek architectural design is not likely to be exaggerated; but the delicate tempering of this precision can be everywhere made out. The temple "partakes" of its *eidos* but it must not entirely display it. In the case of the Parthenon it appears that the builders held so consistently to their faith in the Almost "that they left no straight line straight nor any equal spacing equal." Thus they applied to architecture the same secret of beauty which governs natural forms—the tempering of geometric accuracy by minute deviations in the interest of irregularity. "Nature" is both transcendental and empirical, so the shunning of a stilted and literal perfection is *κατὰ φύσιν* also, and the treatment of geometrical proportions in architecture as though they were the arithmetical relations of a living form maintains in a very subtle way the animism so characteristic of Greek imaginative treatment, so that a temple is at home in the created world.

But when it comes to handling architecture as an art of three dimensions, the Greeks were not in their element. The most remarkable property of Greek architecture is that "since its appearances all lie in parallel or perpendicular planes, it can only *define or bound solid space, and can not enclose it.*" Here, again, I am not sure that I understand, but I think the meaning is that, seen from any position, a temple of the Greek type presents one end or one side, or at most, one side and one end, and that it is not evident to the eye or logically necessary that there be another side and another end so joined to the first that the four enclose a space which

thus makes an inside. The enclosing of a space is, according to Mr. Carpenter, the essence of the whole matter. A building exists in order that there may be an inside; a building is not a piece of scenery; its interior is its essential part. "It is not enough that walls and roof do actually enclose space: it is the artist's part to make them seem to do so, that the spectator may by direct visual apprehension be aware of this power and property of the builded thing." Byzantine and Gothic churches do give the immediate impression of space enclosed. "It is just this power of three-dimensional presentation (so marvellous an achievement of the Gothic style) which I feel to be almost entirely absent in ancient Greek architecture. It confines itself to a two-dimensional presentation."

There are other things in this admirable little book, which the reader will have pleasure in finding for himself. I hope very much that the author of it may publish his study in a larger form with many diagrams and illustrations and a complete apparatus of classical evidence. For in spite of its charm of language and clarity of presentation, it is, I think, a difficult book for those whose knowledge of archeology is as slight as is that of the present reviewer. One finds out that the author's thesis is entirely consistent and simple but one finds it out by an unusual effort of attention. But that is partly because of one great virtue: so much information is garnered into so small a space.

The book is that rarest of things, a real contribution to esthetics, and with Mr. Carpenter's attitudes and reactions in this general field, I can not but have the most cordial sympathy.

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JOURNALS AND NEW BOOKS

SCIENTIA. Volume XXXII, No. CXXVIII–12. The Philosophy of Science or the Principles of Scientific Procedure: *Oliver Lodge.* La théorie électrique et son éther: *G. H. Livens.* Centre le vitalisme: *Ernesto Lugaro.* L'inflation monétaire et la distribution de la richesse: *Maurice Parmelee.* La question sociale et la moralité humaine: *Alfred Loisy.*

Aristote Traductions et Études: La Métaphysique. Livres II et III. Traduction et Commentaire par Gaston Colle. Louvain: L'Institute supérieur de Philosophie de l'Université de Louvain. Paris: Félix Alcan. 1922. Pp. 39–299.

Dix, William Frederick and Salisbury, Randall: Man and the Two Worlds. A Layman's Idea of God. New York and London: Harper & Bros. 1922. 177 pp. $1.50.

Marechal, S. J.: Le Point de Départ de la Métaphysique. Leçons sur le développement historique et théorique du Problème de la Connaissance. 6 cahiers. Cahier I—De l'antiquité à la fin du moyen age: La critique ancienne de la connaissance. (Museum "Lessianum"—Section Philosophique). Bruges (Belgique): Ch. Beyaert. Paris: Felix Alcan. 1922. 12.50 fr.

NOTES AND NEWS

We acknowledge the receipt of the first number of the *Scandinavian Scientific Review* devoted to the contributions to Philosophy, Psychology, and the Science of Education by Northern Scientists and edited by Martin L. Reymert, Ph.D., with the cooperation of National advisers as follows: For Psychology and Philosophy—Professor Anathon Aall, Norway; Professor A. Bjarnason, Iceland; Professor A. Grotenfelt, Finland; Professor G. A. Jaederholm, Sweden; Professor Victor Kuhr, Denmark. For the Science of Education—Professor Otto Anderssen, Norway; Professor A. Bjarnason, Iceland; Professor G. A. Jaederholm, Sweden; Dr. R. H. Pedersen, Denmark; Professor A. Lilius, Finland; Sub-editor, Anne Ross Reymert.

The editor introduces the new periodical with the following preface:

"During the editor's stay at several universities in the United States he repeatedly received the impression that American scientists would like to follow Scandinavian science more closely than could be done through short reviews in German and other periodicals, but that the language difficulties were hard to meet.

"On the other hand it was felt that the Scandinavian scientists themselves would, in the interest of their work, heartily welcome a publication in the English language which might bring the results of their investigations and treatises to the international body of coworkers without delay.

"The editor was well aware of the great responsibility of such an undertaking as well as of the difficulties involved, but considered the venture of such importance that nothing should be left undone in order to thoroughly prepare the way for the realization of the plan.

"In January an invitation was sent to representative scientists of Psychology, Philosophy and Pedagogy in Denmark, Finland, Iceland, Sweden and Norway, asking them to act as national advisers for the coming publication. The answers were very encouraging, the plan being met with enthusiasm by all of them.

"Thus the editor proceeded to negotiate with the Publisher, With & Co., Kristiania, Norway, who, not without serious economical deliberations, undertook to try the new venture.

"Should the new periodical prove to be filling a real need, a monograph series may be added by and by. It is contemplated to extend the sphere of the new publication to include also sciences other than those enumerated above.

"In sending out this first number the editor acknowledges the help of the National advisers, and wishes to express his indebtedness to his wife, whose scholarly and linguistic co-work has been invaluable." (Dated Kristiania, September, 1922.)

The contents of the first issue are as follows: Alfred Lehmann. In memoriam: *Anathon Aall.* The Theory of Relativity and its Bearing upon Epistemology: *Harald K. Schjelderup.* Weight of School-Children in the Summer Time: *R. H. Pedersen.* A New Elbow Ergograph: *Martin L. Reymert.* The Present Status of Psychological Science in Different Countries: I.—Great Britain and Ireland: *C. Spearman* and *J. Flügel.* Book Reviews.

The *Review* is published quarterly by With and Co., Arbeidergaten 1, Kristiania, Norway; the commissioners for the United States are the Albert Bonnier Publishing House, 561 Third Avenue, New York City.

According to arrangements, the Eastern and Western Divisions of the American Philosophical Association met on December 27, 28 and 29. The most notable feature of the meeting was the first series of lectures on the Carus Foundation by Professor John Dewey of Columbia University. Officers for the incoming year were elected as follows: *Eastern Division:* President, Professor W. P. Montague, Columbia University; Vice-president, Professor A. H. Jones, Brown University; Secretary-Treasurer, Professor C. I. Lewis, Harvard University. *Western Division:* President, Professor R. W. Sellars, University of Michigan; Vice-president, Professor H. W. Stuart, Stanford University; Secretary-Treasurer, Professor G. A. Tawney, University of Cincinnati.